

VAA-Weekly-Progress

9/25-10/01

Context

- Last week, we discussed the keypoint labeling methods used by OpenApePose and 300 faces
- We also created a formalized definition of our keypoint definitions and method of dealing with occlusion that we are in the process of refining

Goals

Long-term/Research Question

- Label a dataset of Antelope in Senegal and investigate different approaches to determine what yields optimal performance (training from default weights, pretraining on AP10k Antelopes, pretraining on AP10k similar species, pretraining on all AP10k) - Medha, Parth, Armaan, Claire, Aryan

Short-term

- Attempt to quantify similarity between species in AP10k dataset by leveraging limb lengths or other statistics based on labeled keypoints - Shaan
- Label images on Label Studio to check consistency of definition amongst the group - Shaan, Josh, Aryan, Parth, Armaan
- Create a Script to parse annotations file by category_id/species - Josh
- Fix keypoint definition (which points to be labeled) - Medha and Claire

Agenda

- Training RTMPose on AP10K to replicate the model accuracy listed on OpenMMPose
- Exploring on focusing on certain species within AP10k for future training
 - Antelopes, animals that are in Bovidae family, animals that have a similar build to antelopes
- Finalizing Keypoint definitions

Training RTMPose on AP10k

"coco/AP": 0.6636546984907027

"coco/AP .5": 0.9286670530273308

"coco/AP .75": 0.7190677348093004

"coco/AP (M)": 0.541964965727342

"coco/AP (L)": 0.6662095476608157

Our Training Statistics

Arch	Input Size	AP	AP ⁵⁰	AP ⁷⁵	AP ^M	AP ^L
pose_resnet_50	256x256	0.680	0.926	0.738	0.552	0.687
pose_resnet_101	256x256	0.681	0.921	0.751	0.545	0.690

Retrieved from MMPose:

https://mmpose.readthedocs.io/en/latest/model_zoo/animal_2d_keypoint.html

Differentiating species in AP10K

- Created a script that can filter out by category to extract specific annotations and images for a certain species (can be used to select animals that have a similar appearance to antelopes or are within the same Bovidae family)
- Used the script to create a subset of the data (training, validation, and testing) containing just antelopes for future training purposes

Keypoint Updates

- Hip and Shoulder keypoints will now be estimated using two points to increase our precision (similar to our definition of the neck keypoints)
- The labeling software will estimate the midpoint (yellow) based on the two labeled points (red and blue)



Shoulder Keypoints



Hip Keypoints

Comparing annotations for old keypoint definition



Medha

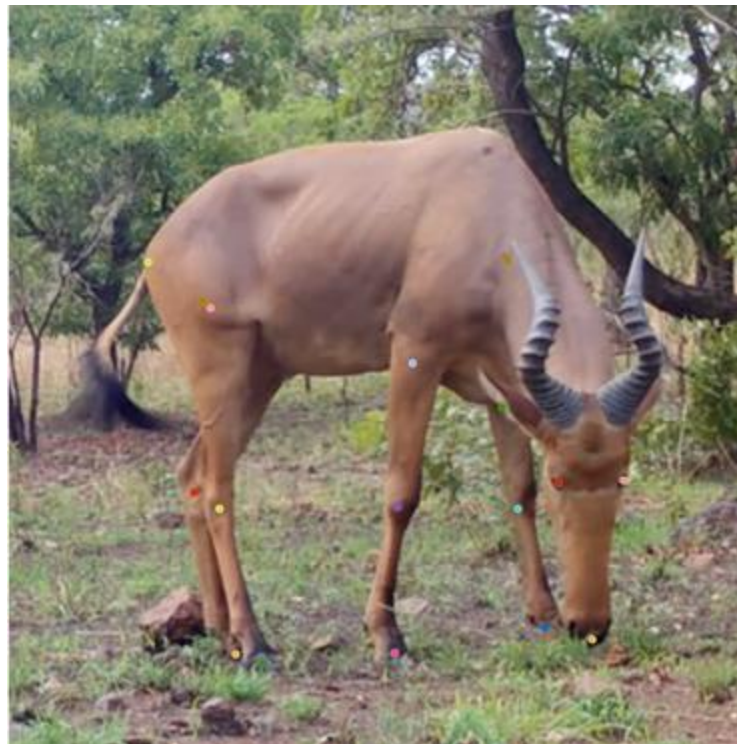


Image 12

Parth

Comparing annotations for old keypoint definition



Medha



Parth

Image 13

Comparing annotations for newest keypoint definition



Medha

Claire



Image 5

Comparing annotations for newest keypoint definition



Parth

Medha



Image 9

Comparing annotations for newest keypoint definition



Medha

Claire



Image 10

Next Steps

- Train RTMPose on Antelope subset
 - Already created script to get annotations for train, test, val
 - Need to work on fully adjusting config file and formatting annotations
- Compare RTMPose pretrained on complete AP10k with RTMPose pretrained on a specific subset (antelopes only) of AP10k by testing on our antelope dataset

Personal Progress

Shaan

- Trained RTMPose on AP10k
- Tried to get Tensorboard working with MMPose
- Looked into quantifying species similarity from pose data, determined body part ratios maybe the best path forward

Medha

- Adjusted Keypoint Definitions
- Familiarized with training process, by checking that my losses and accuracy matched with Shaan's fully-trained model
- Worked on top of Josh's annotation parsing script to extract annotations for train, val, test sets for antelopes for future training
- Edited config file for training only on the antelope subset

Parth

- Labeled more images with adjusted keypoint definitions
- Met with team to discuss further steps in terms of adjusting definition
- Working towards understanding training process for models to match other's model trainings

Armaan

- Labeled more images with adjusted keypoint definitions
- Adjusted keypoint definitions (occlusions)
- Met with team to discuss further steps in terms of keypoint definition
- Familiarized myself with the training process

Josh

- Created Python script on deadcat to parse the annotations json file of the ap10k dataset to create a new annotations file with only the desired species(it only keeps annotations from images with the desired species). It also takes the parsed annotations, finds the associated images and creates a new folder with all the images correlating to the parsed annotation file.
- Read through the AP-10k dataset to analyze their labeling scheme(what they tell their annotators), and what other features of the image they take note of(besides the key points), like background, to help improve our labeling scheme.

Aryan

- Started Labelling images with keypoints according to our definitions
- Met with team to discuss further steps in terms of keypoint definition

Claire Kim

- Adjusted Keypoint Definitions (Hip and Shoulders)
- Labeled images on Label Studio (4, 5, 9, 10, 12, 13)